



DESTRUCTION-FREE PRESS CONNECTION ON PYROMECHANICAL SECURING ELEMENTS

Technical Field

[0001] The invention relates to a pyromechanical securing element according to the preamble of claim 1.

Background of the Invention

[0002] Such a pyromechanical securing element is known from German Offenlegungsschrift 10 338 394, which was published after the priority date of this application.

[0003] This securing element consists of a metallic covering, in the head part of which a pyrotechnic propellant charge is arranged. This propellant charge borders on an adapter. A flanged edge for securing a first component is arranged on the rear part of the covering, bordering on the adapter. A second component can be pushed onto the covering between this first component and the head part so that the second component rests on the first component.

[0004] At its head part, the covering has theoretical break notches running in longitudinal direction, which tear open when igniting the propellant charge, so that the surfaces lying inbetween bend around the adapter and thus press the second component either directly or via a floating disc against the first component, as a result of which the first component is firmly connected to the second component.

Summary of the Invention

[0005] The object of the invention is to improve a pyromechanical securing element according to the preamble of claim 1, so that the covering can be anchored by the adapter without extreme application of force.

[0006] This object is achieved according to the invention in that:

- in the adapter is arranged a groove rotating at least in sections on its outer periphery,
- in that before anchoring the covering with the adapter, a radially projecting collar is arranged on the outer surface of the covering,
- in that the groove in the adapter is aligned with the collar of the covering and
- in that at least one part of the collar is pressed into the groove to anchor the covering with the adapter.

[0007] Due to the arrangement of a groove in the adapter and the collar aligned therewith on the outer surface of the covering, when pressing at least a part of the collar into the groove, extreme application of force is not required to anchor the covering with the adapter.

[0008] In a preferred embodiment, the groove in the adapter and the collar of the covering are designed to be rotating on the particular outer periphery.

[0009] The outer surface of the covering has an at least 3-surface shape after pressing in according to the invention. The covering preferably has a square shape after pressing in. A square shape of the covering and hence of the securing element is particularly advantageous for installation.

[0010] The corners, for example of the square shape of the covering, are advantageously bevelled. This bevelling is effected by pressing the covering into the groove at these points.

[0011] In one embodiment of the invention, the covering is produced from metal and the adapter is preferably designed to be cylindrical. The adapter is usually produced from metal, but may also consist of a strong plastic.

[0012] The groove in the adapter is advantageously arranged centrally with respect to its longitudinal extension.

[0013] The invention is illustrated in more detail below using an exemplary embodiment.

Brief Description of the Drawings

[0014] FIG. 1, is a cross-sectional view taken along the longitudinal axis of a securing element embodying the preferred embodiment of the present invention prior to affixation of the adapter to the covering;

[0015] FIG. 2, is a cross-sectional view corresponding to that of Figure 1 after fixation of the adapter to the covering; and

[0016] FIG. 3, is a cross-sectional view taken along lines 3 – 3 of Figure 2.

Description of the Preferred Embodiment of the Invention

[0017] Figure 1 shows in a longitudinal section, the covering 1 of a pyromechanical securing element 10 in which an adapter or closure member 2 is inserted. The adapter 2 is designed to be cylindrical in this embodiment and preferably consists of metal, like the covering 1. A propellant charge 6, which can be ignited, for example by a laser beam, is arranged in an expandible head part 5 of the covering 1.

[0018] So that the propellant charge 6 or the resulting gases, after ignition thereof, tear open the covering 1 in the region of the head part 5 and it may bend around the adapter 2, theoretical break notches 11 running in longitudinal direction are provided in the head part 5. These theoretical break point notches 11 also run radially on the end-face 12 side of the head part 5.

[0019] A cavity 7 for pressure build-up is arranged between the propellant charge 6 and the adapter 2. When an adapter 2 bordering on the propellant charge 6 is mentioned, this also includes the introduction of a cavity 7 between the latter.

[0020] An annular groove or reduced diameter portion 3 is arranged on the outer periphery of the adapter 2 interspaced by large diameter portions 13 and 14. The covering 1 has a collar 4 rotating on its outer periphery axially aligned with this groove 3.

[0021] Figure 1 shows the securing element 10 before anchoring of the covering 1 with the adapter 2.

[0022] Figures 2 and 3 show the securing element after anchoring, with Figure 2 being in the same longitudinal section as Figure 1. It can be seen clearly that the collar 4 in the state before anchoring (Figure 1) has disappeared in the state after anchoring (Figure 2) on the outer periphery of the covering 1. The material of the collar 4 has been pressed radially in the direction of groove 3 by a pressing or swedging process and is now situated (at least partly) in this groove 3, as a result of which in addition to the very robust mechanical anchoring of the covering 1 with the adapter 2, a square key shape of the securing element having bevelled corners 8 and flats 15 is produced.

[0023] Figure 3 illustrates the original outer peripheral surface of the collar 4 in phantom at 9.

[0024] The three Figures 1 - 3 do not show the securing means or a stop for a first component.

Claims

1. A pyromechanical securing element for mechanical connection of two components, said securing element comprising:

a covering, including a head part;

a pyrotechnic propellant charge disposed within said head part, which borders on an adapter and a securing means or a stop for a first component is arranged on the rear part of the covering and a second component can be pushed onto the covering between the first component and the head part, wherein the covering, at its head part, has theoretical break notches running in longitudinal direction, which tear open the covering in the head region when igniting the propellant charge and let it bend around the adapter, as a result of which the first component is firmly connected to the second component, wherein

- in the adapter is arranged a groove rotating at least in sections on its outer periphery,
- in that before anchoring the covering with the adapter, a radially projecting collar is arranged on the outer surface of the covering ,
- in that the groove in the adapter is aligned with the collar of the covering and
- in that at least one part of the collar is pressed into the groove to anchor the covering with the adapter.

2. The securing element according to claim 1, characterised in that the groove in the adapter and the collar of the covering) are designed to be rotating on the particular outer periphery.

3. The securing element according to claim 1, characterised in that the outer surface of the covering has an at least 3-surface shape after pressing in.

4. The securing element according to claim 3, characterised in that the covering has a square shape with preferably bevelled corners after pressing in.

5. The securing element according to claim 1, characterised in that the covering is produced from metal.

6. The securing element according to claim 1, characterised in that the adapter is designed to be cylindrical.

7. A pyromechanical securing element for mechanical interconnection of two components, said securing element comprising:

a generally cylindrical housing which is substantially closed at one end thereof to define an expandable head portion;

a generally cylindrical closure member slidably disposed within said housing, said closure member defining first and second axially spaced large diameter portions and an intermediate reduced diameter portion; and

a pyrotechnic propellant charge disposed in said head portion intermediate said closed end and said closure member,

wherein said housing defines a radially thickened collar portion which is axially aligned with the reduced diameter portion of said closure member and extends radially inwardly to effect a swedge-like engagement therebetween.

8. The securing element according to claim 7, wherein said thickened collar portion defines a plurality of circumferentially arranged flats on the outer surface thereof.

9. The securing element according to claim 7, further comprising notches formed in said head part to effect predetermined expansion thereof upon combustion of said propellant charge.

10. The securing element according to claim 7, further comprising an axial spacing intermediate said closure member and said propellant charge.

DP-313453

DESTRUCTION-FREE PRESS CONNECTION ON
PYROMECHANICAL SECURING ELEMENTSAbstract of the Disclosure

The invention relates to a pyromechanical securing element for the mechanical connection of two components. The securing element comprises a covering and a pyrotechnical propellant charge is arranged in the head part thereof, said propellant charge being adjacent to an adapter, and securing means or a stop for the first component are arranged on the rear part of the covering and a second component can be pushed onto the covering between the first component and the head part. The covering on the head part comprises expected fracture indents extending in the longitudinal direction which tear open the covering in the head area when the propellant charge is ignited and the first component is rigidly connected to the second component in order to allow the adapter to bend. The aim of the invention is to securely anchor the covering to the adapter without using extreme force. Said invention is characterized in that the groove is arranged in the adapter in such a manner that it at least sectionally surrounds the outer periphery thereof, and that a radially protruding collar is arranged on the outer surface of the cover before the cover is anchored to the adapter, and the groove disposed in the adapter is flush with the collar of the cover and at least one part of the collar is pressed into the groove in order to anchor the cover with the adapter.

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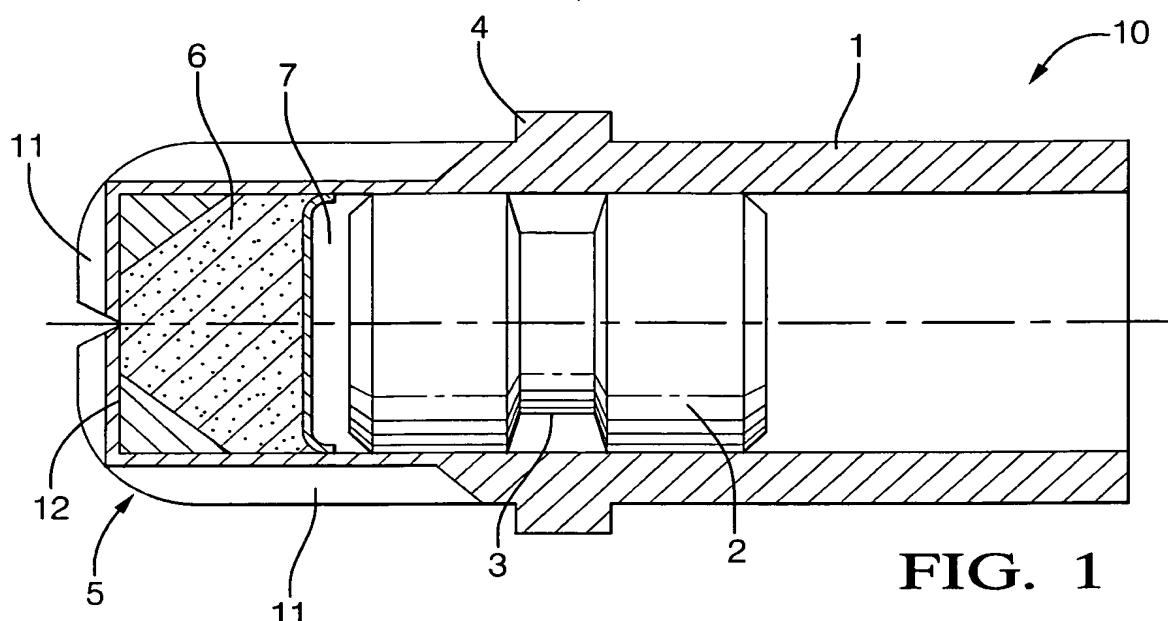


FIG. 1

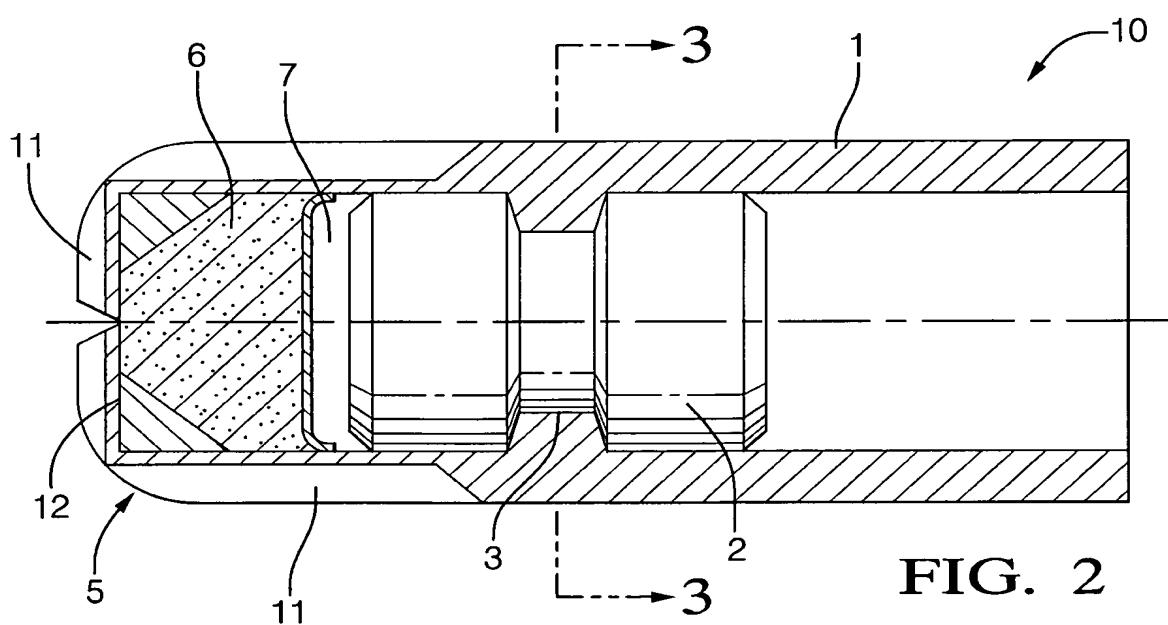


FIG. 2

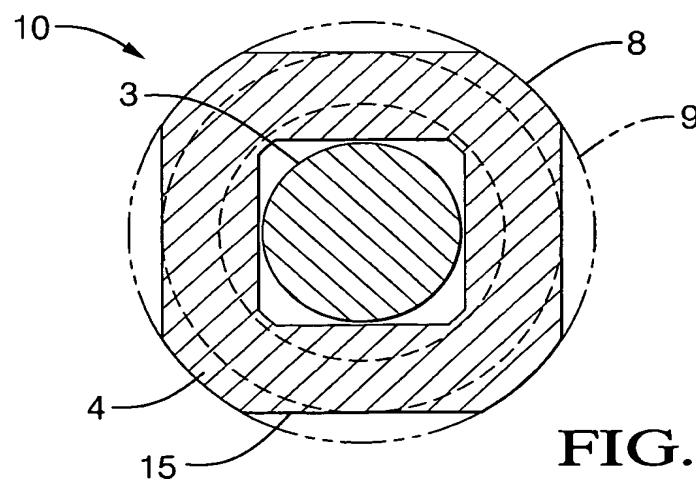


FIG. 3